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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,234	09/17/2003	Chih-Han Chang	NTCP0004USA	3393

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MERRIFIELD, VA 22116

EXAMINER

NGUYEN, KHIEM D

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 11/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/605,234

Applicant(s)

CHIH-HAN CHANG

Examiner

Khiem D Nguyen

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

The rejection from paper No. 062304 sent June 29th, 2004 is incorporated in this paper. It is presented here for convenience.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Wensley et al. (U.S. Patent 6,316,310).

In re claim 1, Wensley discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate **100** having a pad oxide and the pad nitride layer **102** thereon (col. 2, lines 22-34), the pad oxide layer and a pad nitride layer having at least an opening; performing a dry etching process for forming a deep trench **104** in the substrate via the opening (col. 2, lines 22-34); depositing a doped silicate glass film **106** on an inner wall of the deep trench (col. 2, lines 26-34); filling a sacrificial layer **110** into the deep trench (col. 2, lines 43-49); etching back the sacrificial for exposing parts of the doped silicate glass film (col. 2, lines 50-61 and FIGS. 3-4); removing the exposed doped silicate glass film (FIG. 7); removing the remaining sacrificial layer (FIG. 5); depositing a silicon nitride layer on the inner wall of the deep trench; performing a thermal process for forming a doped region **114** at a bottom of the trench (col. 2, lines 54-61 and FIG. 6); removing the silicon nitride layer; and removing the doped silicate glass film (col. 2, lines

62-64 and FIG. 7); wherein the silicon nitride layer serves as a barrier layer for preventing ions of the doped silicate glass film from diffusing into a collar region of the deep trench (col. 2, lines 65 to col. 3, line 20 and FIGS. 1-9).

In re claim 2, Wensley discloses wherein the doped silicate glass film 106 is an arsenic silicate glass (ASG) film (col. 2, lines 21-34).

In re claim 3, Wensley discloses wherein the arsenic silicate glass film is formed by a chemical vapor deposition (CVD) process (col. 2, lines 21-34).

In re claim 4, Wensley discloses wherein the silicon nitride layer is formed by a chemical vapor deposition process (col. 2, lines 21-42).

In re claim 5, Wensley discloses wherein the doped silicate glass film is removed by an anisotropic etching process (col. 2, lines 50-53).

In re claim 6, Wensley discloses wherein the silicon nitride layer is removed by an anisotropic etching process (col. 2, lines 21-64).

2. Claims 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Wensley et al. (U.S. Patent 6,316,310).

In re claim 7, Wensley discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate 100 having a pad oxide and the pad nitride layer 102 thereon (col. 2, lines 22-34), the pad oxide layer and a pad nitride layer having at least an opening; performing a dry etching process for forming a deep trench 104 in the substrate via the opening (col. 2, lines 22-34); depositing a doped silicate glass film 106 on an inner wall of the deep trench (col. 2, lines 26-34); filling a sacrificial layer 110 into the deep trench (col. 2, lines 43-49); removing a portion of the sacrificial for exposing

parts of the doped silicate glass film (col. 2, lines 50-61 and FIGS. 3-4); performing an etching process to remove the exposed doped silicate glass film and a portion of the pad nitride layer for forming a recess (FIGS. 6-7); removing the remaining sacrificial layer (FIG. 5); depositing a silicon nitride layer on the inner wall of the deep trench; performing a diffusing process for forming a doped region 114 at a bottom of the trench (col. 2, lines 54-61 and FIG. 6); removing the silicon nitride layer; and removing the doped silicate glass film (col. 2, lines 62-64 and FIG. 7); wherein the silicon nitride layer serves as a barrier layer for preventing ions of the doped silicate glass film from diffusing into a collar region of the deep trench (col. 2, lines 65 to col. 3, line 20 and FIGS. 1-9).

In re claim 8, Wensley discloses wherein the doped silicate glass film 106 is an arsenic silicate glass (ASG) film (col. 2, lines 21-34).

In re claim 9, Wensley discloses wherein the arsenic silicate glass film is formed by a chemical vapor deposition (CVD) process (col. 2, lines 21-34).

In re claim 10, Wensley discloses wherein the silicon nitride layer is formed by a chemical vapor deposition process (col. 2, lines 21-42).

In re claim 11, Wensley discloses wherein the etching process is an anisotropic etching process (col. 2, lines 50-53).

In re claim 12, Wensley discloses wherein the silicon nitride layer is removed by an anisotropic etching process (col. 2, lines 21-64).

Response to Applicant's Amendment and Arguments

Applicant's arguments filed September 21st, 2004 have been fully considered but they are not persuasive.

Applicants contend that the reference Wensley et al. (U.S. Patent 6,316,310) herein known as Wensley fails to teach or suggest forming the undoped glass layer 108 after removing the photoresist layer 110.

In response to applicant's argument that the references fail to show certain features of applicant's invention as described above, it is noted that the features upon which applicant relies (i.e., forming the undoped glass layer 108 after removing the photoresist layer 110, or in other words, Applicants' claimed limitation of depositing a silicon nitride layer on the inner wall of the deep trench after filling a sacrificial layer into the deep trench) are not clearly recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants further argue that the method of independent claims 1 and 7 is characterized by depositing a silicon nitride layer 64 (refer to Fig. 7) as a barrier layer after removing the sacrificial layer. The silicon nitride layer 64 covers the upper portion of the deep trench (collar region), and therefore prevents diffusion of arsenic into the collar region of the deep trench. However, it is noted that the features upon which applicant relies (i.e., depositing a silicon nitride layer as a barrier layer after removing the sacrificial layer wherein the silicon nitride layer covers the upper portion of the deep trench (collar region)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

For these reasons, examiner holds the rejection proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K.N.

November 17th, 2004



W. David Coleman
Primary Examiner